



Figure 4. Ingestion rate, egestion rate, assimilation rate, and assimilation efficiencies (mean + SE) of *Biomphalaria peregrina*, *Physa venustula*, and *Chilina parchappii* fed on artificial substrates. Columns sharing the same lower-case letter are not significantly different from each other.

been thought to be energetically disadvantageous (Cedeño-León & Thomas, 1982; Thomas, 1982). Mackenstedt & Markel (1987) determined that the replacement of teeth in some freshwater gastropods is a continuous process and that *Lymnaea*, for example, replaces a whole radula in 24 days. Although aquatic plants do not constitute a food item for *Chilina*, almost half of the specimens swallowed their own radular teeth. The presence of teeth in the stomachs of *Chilina* corresponds therefore to this natural replacement process, and is not a consequence of food hardness.

Ingestion rates calculated for *Chilina parchappii* were much lower than the rates for the other two species. Since the algae colonizing the slides were those normally eaten in the same proportion as they appear on the substrate, this difference was probably due to ethological factors.

The assimilation values found in this study fit within the range already published for other pulmonate species (reviewed by Brendelberger, 1997). The strength of the crop differs from the slender crop of *Physa* to the strong, muscular one of *Chilina*, possibly accounting for observed differences in efficiency rates. *Biomphalaria* and *Chilina* better fit the primitive model of stomach-grinders (Brace, 1983). The highest assimilation efficiency was shown by *Biomphalaria*, which is the species with the highest proportion of sand in the crop. *Physa*, the species with the highest ingestion rate, has the weakest stomach and the lowest efficiency. *Chilina*, with its strong grinding

stomach, compensates for its low ingestion rate and reaches a high assimilation efficiency.

*Chilina parchappii*, endemic and less active than the other species, is subject to a probable risk of competition in a case of food shortage. The potential for food limitation in lotic ecosystems is small, but there is evidence (mostly indirect) suggesting that inadequate food supplies can limit some stream invertebrate populations (Crowl & Schnell, 1990; Hill, 1992).

Competition among snails is highly improbable in the present area of sympatry, i.e., the lower basin of the Napostá Grande stream, which is rich in detritus, but it may occur if the invader *Physa* reaches the oligosaprobic sector of the stream where *Chilina parchappii* is the dominant species. In recent years, *Physa* has advanced some 50 km upstream (Martín, 1999).

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## NOTES, INFORMATION & NEWS

### Designation of a Lectotype for *Succinea grosvenorii* Lea (Mollusca: Gastropoda: Pulmonata)

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The description of *Succinea grosvenorii* Isaac Lea, 1864 (p. 109) consisted of a short diagnosis in Latin and a listing of two collection localities and collectors involved.<sup>1</sup>

In the many species described by Lea, the indication “Hab.” (Habitat) has traditionally been considered as defining a type locality for the species. However, in the case of *Succinea grosvenorii*, two localities were listed (1864: 109): “Hab.—Santa Rita Valley, Kansas? Mr. H. C. Grosvenor; and Alexandria, Louisiana, J. Hale, M.D.” An objective of this paper is to establish a single type locality for this species. Lea (1867:135) noted “From the two habitats I have some twenty specimens.” He described those from Santa Rita Valley, Kansas, as being “all dead shells and opaque white from partial decomposition.” In contrast, those from Alexandria, Louisiana, he depicted as shells “in a perfect state” and of a “fine bright straw color.” Both of these lots are in collections of the National Museum of Natural History. Dr. Robert Hershler, of the museum, reports that the seven whitish specimens from Santa Rita Valley (USNM 121065) are likely subfossil. The 13 specimens from Alexandria, Louisiana (USNM 117878) still retain the straw color attributed to them by Lea. These latter specimens have been separated into two lots, with 12 shells in one box and a single one in another box. Before discussing labels found in these boxes, I summarize some notes concerning the Lea Col-

lection of the National Museum, these also provided by Dr. Hershler.

The National Museum did not acquire the large Isaac Lea Collection until after Lea’s death in 1886. These were mainly in the form of syntype lots. At the time of World War II, for safekeeping, attempts were made to separate out from syntype lots those specimens thought to have been illustrated by Lea in his various publications. These were referred to as “figured holotypes,” seemingly assuming that Lea had intended them as such. There exists such a “figured holotype” in the case of *S. grosvenorii*.

Of the two boxes with shells of *S. grosvenorii*, noted above, one box contains 12 specimens that were referred to as paratypes, and the other box contains a single specimen, slightly larger than any of the “paratypes,” and which is labeled as a figured holotype. There is a single label in the box of “paratypes” and two labels in the other box with the single specimen. For convenience, these labels are numbered 1–3, below.

Label 1. This label is in the box with 12 shells. It is written on a museum label preprinted with “U. S. Nat. Mus.” and “Lea Coll.” Handwritten is:

117878    *Succinea grosvenori* Lea.  
PARATYPES    Alexandria, La.    Hale.

Perhaps this label was written at the time, in the 1940s, noted above, when “types” were separated for safekeeping.

Label 2. This is one of two labels in the box with a single specimen. This is also a USNM label and with the designations “U. S. Nat. Mus.” and “Isaac Lea Coll.” The words “FIG’D HOLOTYPE” appear in printed handwriting. The other words are in an elegant, cursive style, with flourishes embellishing capital letters, a style still common at least until the latest 1800s.

117878    *Succinea Grosvenori*, Lea  
FIG’D. HOLOTYPE.  
Alexandria La.    Hale

As this is a National Museum label, it must postdate the time of Lea’s death in 1886, after which Lea’s collection was acquired by the museum. Perhaps it is even later than 1906, when Pilsbry, at least, had started to use the spelling *grosvenori*. However, the marked difference in styles of handwriting would suggest that the part of the label in cursive hand was written earlier than the printed words “FIG’D HOLOTYPE,” which might have been inserted on an empty line in the 1940s, as discussed above.

Label 3. This label is in the same box as Label 2. The paper is yellowed with age, and the right side of the label

<sup>1</sup>The patronymic specific name (for H. C. Grosvenor) terminated in *-ii*, the spelling also utilized by Lea (1867:135) in an amplified discussion of this species. Subsequently, the *-ii* ending was used by various other authors including Pilsbry’s catalogue of land snails (1898:143), and even later, as in Shimek (1935). However, Pilsbry & Ferriss used the single *-i* as early as 1906, as did Pilsbry also in his monograph of North American land mollusks (1948:819). In the synonymy of the species in the monograph, he erroneously indicated that the *-i* spelling had been employed in Lea’s original description. Subsequent authors have followed Pilsbry’s example (1948), and employed the single *-i* ending, as in Turgeon, ed. (1998:146). Article 33.4 of the fourth edition of the *International Code of Zoological Nomenclature* (2000:43) indicates that the use of an *-i* ending for a species name originally and correctly employing the *-ii* ending is incorrect. Thus, in this species it seems clear that the correct specific name is *grosvenorii*.